
The valproic acid rat model of autism presents with gut bacterial dysbiosis similar to that in human autism.

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Public Summary:

Background: Gut microbiota has the capacity to impact the regular function of the brain, which can in turn affect the composition of microbiota. Autism spectrum disorder (ASD) patients suffer from gastrointestinal problems and experience changes in gut microbiota; however, it is not yet clear whether the change in the microbiota associated with ASD is a cause or a consequence of the disease. **Methods:** We have investigated the species richness and microbial composition in a valproic acid (VPA)-induced rat model autism. Fecal samples from the rectum were collected at necropsy, microbial total DNA was extracted, 16 rRNA genes sequenced using Illumina, and the global microbial co-occurrence network was constructed using a random matrix theory-based pipeline. Collected rat microbiome data were compared to available data derived from cases of autism. **Results:** We found that VPA administration during pregnancy reduced fecal microbial richness, changed the gut microbial composition, and altered the metabolite potential of the fecal microbial community in a pattern similar to that seen in patients with ASD. However, the global network property and network composition as well as microbial co-occurrence patterns were largely preserved in the offspring of rats exposed to prenatal administration of VPA. **Conclusions:** Our data on the microbiota of the VPA rat model of autism indicate that this model, in addition to behaviorally and anatomically mimicking the autistic brain as previously shown, also mimics the microbiome features of autism, making it one of the best-suited rodent models for the study of autism and ASD.

Scientific Abstract:

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